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## SHEET FOR CLEANING

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[There are no amendments to this patent.]

### Abstract

#### Constitution

A sheet for cleaning characterized by the fact that in a laminated sheet consisting of a sheet composed of pulp, or pulp and synthetic fibers and a nonwoven fabric having open holes over the entire surface, the nonwoven fabric having said open holes is used on the surface of the laminated sheet.

#### Effect

A sheet for cleaning that can be repeatedly used in cleaning the hard surfaces in kitchens, toilets, bathrooms, etc., is obtained by using the laminated sheet of the present invention.

### Claims

1. A sheet for cleaning characterized by the fact that in a laminated sheet consisting of a sheet composed of pulp, or pulp and synthetic fibers and a nonwoven fabric having open holes over

the entire surface, the nonwoven fabric having said open holes is used on the surface of the laminated sheet.

2. The laminated sheet of Claim 1, wherein the nonwoven fabric having open holes include fibers with adhesion.

Detailed explanation of the invention

[0001]

Industrial application field

The objective of the present invention pertains to a sheet that enables continuous use for cleaning hard surfaces in kitchens, toilets, bathrooms, etc.

[0002]

When the hard surfaces in kitchens, toilets, bathrooms, etc., are cleaned in the home, a wetcloth has frequently been used as a cleaner and is provided for cleaning. If the wetcloth is not sufficiently rinsed with water after use, an offensive odor is emitted; this is a problem when it is next used. Therefore, a disposable cleaning sheet using pulp has recently been marketed. However, nowadays, resource problems and waste matter problems have arisen, and such a disposable product has been increasingly criticized. The present invention solves such problems; its purpose is to provide a sheet for cleaning which can be used while using a pulp sheet as a main constituting element.

[0003]

Means to solve the problem

The present invention pertains to a sheet for cleaning characterized by the fact that in a laminated sheet consisting of a sheet composed of pulp, or pulp and synthetic fibers and a nonwoven fabric having open holes over the entire surface, the nonwoven fabric having said open holes is used on the surface of the laminated sheet.

[0004]

As for the pulp used here, there are tree and grass pulps such as kraft pulp, chemithermomechanical pulp, and bagasse of coniferous trees and deciduous trees, chemically modified pulps of krafting, etc., such as [pulps modified by] mercerization, nitration, carboxymethylation, acetylation, styrene, and acrylic acid, and biomodified pulps treated with cellulase, hemicellulase, etc.

[0005]

As the synthetic fibers, fibers of polyolefin group, polyester group, polyamide group, polyvinyl alcohol group, polyacrylonitrile group, etc., can be used. Composite fibers with core-shell structure, sea-island structure, and side-by-side structure, fibers with different acircular sections, split fibers that can be extremely miniaturized, etc., can be used. Preferably, synthetic fibers with adhesion, for example, heat-

fusible fibers such as heat-fusible polyolefin fiber and polyester fiber with a low melting point, moisture and thermo adhesive fibers such as polyvinyl alcohol fiber, which exerts adhesion under high temperature and high humidity, are mixed at a ratio of pulp and synthetic fiber with adhesion = 97:3-50:50, so that a wet-paper sheet is obtained.

[0006]

It is important for the nonwoven fabric to have open holes with an appropriate size over the entire surface. In general, in the nonwoven fabric, fibers are nearly uniformly distributed, and the interval between the fibers is very small. Therefore, when open holes are not made, in particular, in the nonwoven fabric consisting of relatively hydrophobic fibers composed of synthetic fibers, it is favorable when a cleaning solution containing an activator is used. However, when cleaning is carried out only with water using the laminated sheet, or when the laminated sheet is firmly squeezed and absorbs an overflow of water, the penetration of the water is low, and it cannot be used as a cleaning sheet. Therefore, for the open holes mentioned here, a size through which water can freely pass is required. The size may be controlled so that the laminated internal pulp is not exposed to the surface. The shape of the open holes, for example, circle, elliptical, triangle, square, or hexagonal, etc., can be arbitrarily selected, however, as to the size, the diameter is preferably 1-4 mm. The ratio (open hole rate) of the open holes occupying the surface area is preferably 50-95%.

[0007]

In the application of the present invention, the method is not particularly limited, however, for example, such a nonwoven fabric having open holes over the entire surface can be easily manufactured by the water needle method using a screen in which hexagonal holes are opened, drawing method, etc. As the fiber used in the nonwoven fabric, regenerated fibers such as rayon and synthetic fibers are favorable, and if necessary, a pulp can also be mixed. However, it is desirable to include polyolefin fibers, heat-fusible fibers containing polyester with a low melting point, and fibers with adhesion under high temperature and high humidity. The fibers with adhesion are preferably included at 10-100% in the nonwoven fabric.

[0008]

In the laminated sheet of the present invention consisting of a pulp sheet composed of pulp or pulp and synthetic fibers and a nonwoven fabric having open holes, the pulp sheet is placed inside, and the nonwoven fabric having open holes is placed outside. In other words, it is placed as a so-called laminated sheet on the surface; in general, the pulp sheet and the nonwoven fabric are adhered by heat embossing, ultrasonic embossing, etc. The laminated sheet obtained can be used as it is as a sheet for cleaning, however, a cleaning solution containing a surfactant, solvent, alkali agent, etc., may also be impregnated.

[0009]

#### Application examples

Next, the present invention is explained in detail by application examples, however, the present invention is not limited to the application examples.

[0010]

#### Application Example 1

To a paper material in which a bleached kraft pulp (NBKP) made from coniferous trees and PET (unstretched product) of 1.1 de x 5 mm are mixed at the ratio shown in Table I, Kymene 557H (made by Dick [transliteration] Hercules Co.) as a wet-strength enhancer was added, at a ratio of 1.2 wt% to the pulp and using a cylinder/Yankee papermaking machine, 40 g/m<sup>2</sup> pulp sheet was manufactured. The raw material pulp was used without striking, and the crepe ratio was set to 17%.

[0011]

As a nonwoven fabric, ES (made by Chisso Corporation) of 3 de x 51 mm, an olefin group composite fiber, was laminated by a card method and entwined by the water needle method, so that a sheet of 10 g/m<sup>2</sup> was manufactured. The open holes made by the water needle method were about 2 x 2 mm, and the open hole rate was 40% and 70%. Also, a nonwoven fabric without open holes was manufactured and used in a comparative test.

[0012]

The pulp sheet was installed inside, and said nonwoven fabric was laminated on both surfaces and heat-embossed.

[0013]

The evaluation results are shown in Table I.

[0014]

[Table I]

Table I

		実施例①			比較例②		
		1	2	3	1	2	3
③ パルプシート	N B K P	100	90	80	100	100	80
	P E T	0	10	20	0	0	20
④ 不織布	開孔率70%	-	-	+	-	-	-
	開孔率40%	+	+	-	-	-	-
	開孔率0%	-	-	-	-	+	+
⑤ 乾燥引張強度(M.D) g/25mm		2500	2600	2550	1050	2700	2900
⑥ 湿潤引張強度(M.D) g/25mm		2300	2400	2300	300	2400	2500
⑦ 湿潤表面強度		○	○	○	×	○	○
⑧ 吸水性		○	○	○	○	×	×

Key: 1 Application Example  
 2 Comparative Example  
 3 Pulp sheet

4 Nonwoven fabric  
5 Dry tensile strength (MD) g/25 mm  
6 Wet tensile strength (MD) g/25 mm  
7 Wet surface strength  
8 Hydrophilicity  
9 Open hole rate \_\_\_\_%

[0015]

The method for measuring each property of the sheet of Table I is as follows.

[0016]

(1) Dry strength

Using a Tensilon (Orientec Corporation, model RTM-25), a sample 2.5 cm width x 10 cm length was installed at a gauge while setting a chuck to 5 cm. The dry strength was measured at a tensile speed of 300 mm/min.

[0017]

(2) Wet strength

1 cc ion-exchanged water was dropped in the center of a sample 2.5 cm width x 10 cm length, and the wet strength was measured by the same method as (1).

[0018]

(3) Wet surface strength

Using a wear tester (made by Toyo Seiki Co., Ltd.), a sheet sample (7 x 5.5 cm) was installed on a movable part, and a tile surface (a tile of 2 x 2 cm was adhered by a joint) was reciprocated 300 times at a load of 1 kg. The state of the surface was observed by the naked eye.

[0019]

- o: Slightly changed from the initial sample
- x: Broken parts were seen on the surface

(5) Hydrophilicity

1 cc ion-exchanged water was dropped on the surface by a Komagome [transliteration] pipet, and the absorption of the water was observed.

[0020]

- o: Absorbed by the sheet in less than 5 sec
- x: 5 sec or longer for absorption in the sheet

[0021]

**Effect of the invention**

A cleaning sheet that can be repeatedly used in cleaning the hard surfaces in kitchens, toilets, bathrooms, etc., by using the laminated sheet of the present invention.